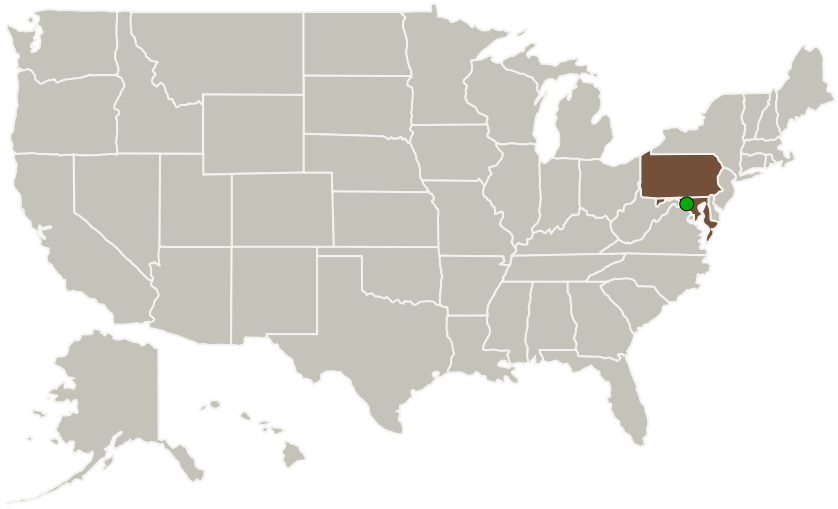
Flexible Methane & Ethane Heat Pipes, Phase I

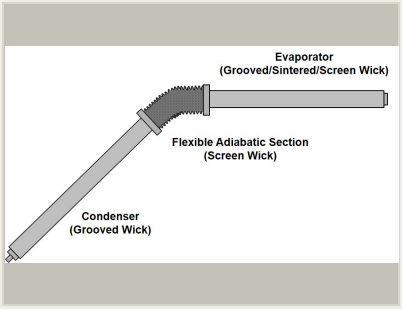
Completed Technology Project (2016 - 2016)

Project Introduction

Specific mission requirements can often requirecall for some degree of flexibility such as minimizing mechanical loads induced into payloads containing highly sensitive positional sensors or allowing containment of radiator panels within spacecraft fairing until deployment into fully operational positions. Flexible thermal straps and Loop Heat Pipes (LHP) are typically used for this flexible thermal link. Thermal straps are a lower technology solution for lower heat transport applications (<10 Watt) that need small mechanical displacement. LHPs can transport kilowatts of heat over long distances and have transport lines and condenser tubes that are flexible, bendable, and easily routed through complex paths. Drawbacks of LHPs include being significantly more expensive to fabricate and qualify. Flexible Constant Conductance Heat Pipes (CCHPs) can fill the gap between flexible thermal straps and loop heat pipes. The Small Business Innovative Research (SBIR) program proposed by Advanced Cooling Technologies, Inc. (ACT) will design, fabricate, and demonstrate a cryogenic flexible CCHP for a passive thermal management device.

Primary U.S. Work Locations and Key Partners





Flexible Methane & Ethane Heat Pipes, Phase I

Table of Contents

Flexible Methane & Ethane Heat Pipes, Phase I

Completed Technology Project (2016 - 2016)

Organizations Performing Work	Role	Type	Location
Advanced Cooling Technologies, Inc.	Lead Organization	Industry	Lancaster, Pennsylvania
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Pennsylvania

Project Transitions

June 2016: Project Start

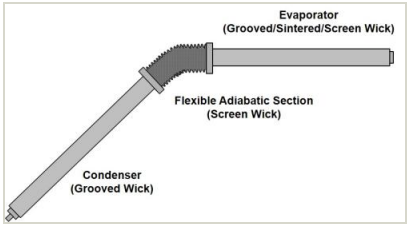
December 2016: Closed out

Closeout Summary: Flexible Methane & Ethane Heat Pipes, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139783)*

Images



Briefing Chart Image
Flexible Methane & Ethane Heat Pipes, Phase I
(https://techport.nasa.gov/image/136996)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Advanced Cooling Technologies, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

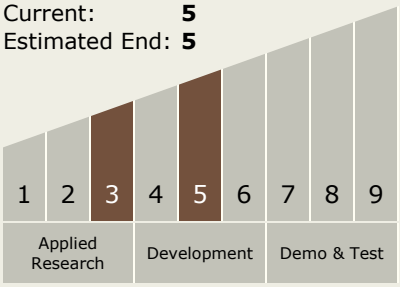
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Calin Tarau

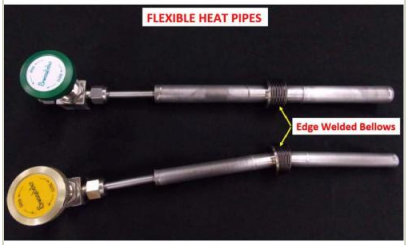
Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Flexible Methane & Ethane Heat Pipes, Phase I

Completed Technology Project (2016 - 2016)



Final Summary Chart Image
Flexible Methane & Ethane Heat Pipes, Phase I Project Image *(https://techport.nasa.gov/image/130555)*

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.2 Heat Transport

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System